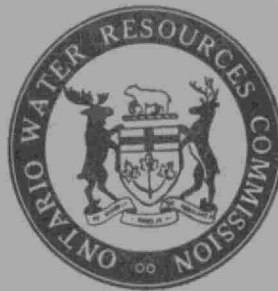


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THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF TWEED

COUNTY OF HASTINGS

VILLAGE OF TWEED - 1968
COUNTY OF HASTINGS

1968

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R E P O R T

on a

WATER POLLUTION SURVEY

of the

V I L L A G E O F T W E E D

DIVISION OF SANITARY ENGINEERING

DISTRICT ENGINEERS BRANCH

FEBRUARY 1968

WATER POLLUTION SURVEY

of the

VILLAGE OF TWEED

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ONTARIO WATER RESOURCES COMMISSION

R E P O R T

INTRODUCTION

A water pollution survey of the Village of Tweed was conducted by Commission staff on July 20, 1967. This type of survey is intended to locate potential and existing sources of pollution which could adversely affect ground and surface water quality. If the results of the survey indicate a pollution problem, corrective action is recommended to those parties concerned.

Bacteriological and sanitary chemical samples were collected from pertinent points in the village. The samples collected were submitted to the OWRC Laboratory in Toronto for examination and analysis.

The appendices to this report include the laboratory results, a map showing the location of the sampling points as well as an interpretation of the analyses. The methods available to finance the development of water and sewage works are also outlined in the appendices. At present the Village of Tweed does not have an official plan. To encourage an interest in planning, a section has been included on the need for local planning.

The following is a list of officials who gave their time to help with this survey:

Mr. John F. King, Field Officer
Moira River Conservation Authority.

Mrs. B. Allen, Reeve,
Village of Tweed.

Mr. W. J. Woods, Road Superintendent
Village of Tweed.

Mr. W. Shih, Public Health Inspector
Hastings & Prince Edward Counties Health Unit.

Mr. L. A. Ellenton, Chief Public Health Inspector
Hastings & Prince Edward Counties Health Unit.

VILLAGE OF TWEED

General

The Village of Tweed is located 24 miles north of the county seat of Belleville, on Highway #37. In 1891, Tweed became an incorporated Village occupying a tract of land 468 acres in size. The present population according to the 1967 Municipal Directory is 1,657. The Village of Tweed can be described as a modified agricultural community. It serves the needs of the local farmers, and the development of some light industries has taken place.

Geology

The bedrock on which the Village of Tweed is located, is composed of igneous and metamorphic rock formed during the Geological Period known as the Precambrian Era. The surface soil in this area is a sandy loam which varies in depth according to the location and also has a good drainage characteristics.

Surface Waters

The Village of Tweed sits astride the Moira River where it enters the west side of Stoco Lake. These two bodies of water receive surface drainage from the village.

The Moira River System finds its source from the forests and lakes in Cashel, Grimsthorpe and Tudor Townships some 30 miles north-west of the Village of Tweed. The Moira River System drains an area of approximately 1090 square miles. The Moira River exhibits the three ages of stream development at various sections throughout its length. The water quality of the Moira River within the Village of Tweed varies greatly. Although the sanitary chemical BOD did not substantiate the deterioration in the stream, the bacterial quality indicated that forces were at work which could cause impairment of the water quality. The results of the samples collected on September 20, showed an overall further deterioration.

The Moira River flows into Stoco Lake at Tweed and the overflow escapes by two branches at the southern end of the lake. The waters of Stoco Lake are used for bathing and swimming during the summer months. The local health authorities had seen fit to post the park beach as unfit for swimming as a result of their routine sampling programme. The quality of water, as indicated by the samples collected in July, was generally satisfactory although visual evidence in the form of profuse algal growths, were noted in the area of

the park septic tank outfall. During the month of September, a resampling of pertinent areas indicated an increase in BOD and coliform bacteria content.

The Moira River Conservation Authority maintains two water quality monitoring stations on the Moira River in the vicinity of the Village of Tweed. One station is located at Jameson Street in Tweed and a second station is located at the county bridge in the Township of Madoc. The water quality data obtained from these stations during the period from October 1965 to February 1968, has been included in the appendix.

The laboratory results of the samples collected indicate that the Moira River has significant levels of nitrogenous matter as well as phosphorus in this section. Nutrient enriched waters such as these will encourage the growth of aquatic plants barring other limiting factors. Common sources of nutrients in rural areas include drainage from farmlands as well as human or animal wastes which may gain access to the local watercourse.

Water Supplies

The Village of Tweed is presently served by a municipal water works system. Water is obtained from two drilled wells and then directed to a standpipe which has a capacity of 160,000 gallons. The chemical and bacterial quality of the raw water has proven to be generally satisfactory and

no treatment of this supply has been considered necessary.

Waste Disposal Facilities

The Village of Tweed is served by a municipal system which consists of three septic tanks and a combines storm and sanitary collection system. Two septic tanks having capacities of 1530 and 5000 gallons discharge to the Moira River through submerged outfall pipes. Effluent samples could not be obtained. Samples collected downstream of these outfalls indicate a marked deterioration in the bacterial quality of the water most probably as a result of inadequately treated sewage being discharged. No other outfalls are known to be in the above mentioned areas. A larger septic tank having a capacity of approximately 16,500 gallons is located in the village park. The effluent from this septic is discharged through a submerged outfall to Stoco Lake. Although the effluent is chlorinated, a satisfactory contact period is not provided before being discharged to the lake.

The Village of Tweed is presently engaged in steps to update and improve their present disposal system. The development of a sewage lagoon to replace the septic tanks now being used is being considered along with improvements to the collection system.

In general, the industries in the village are connected to the municipal collection system and no problems have been reported. A localized problem in the area of Lakewood Timber Products was noted and has been referred to our Division of Industrial Wastes for further investigation.

Solid wastes from the village are disposed at a site south of the village. No problems with the operation of this site have been reported.

SUMMARY & CONCLUSIONS

A water pollution survey of the Village of Tweed was undertaken during July, 1967. A second set of samples were collected on September 20, 1967, to review any changes in the water quality. The results of the survey indicate that the water quality of the Moira River and Stoco Lake has deteriorated as a result of the inadequacy of the present sewage disposal practices.

The municipal officials of the Village of Tweed have taken a progressive approach to pollution abatement. At present a provincially financed sewage works programme is being developed to replace the present system of septic tanks.

/cb

Prepared By:


J. A. Clarke,
Technologist,
Division of Sanitary Engineering.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

APPENDIX II

COMMUNITY PLANNING

The need for effective planning has become more important today than ever before. Municipalities are being burdened with the rising costs of land and labour. Therefore any project a community hopes to develop should be based on sound planning. Planning at all levels of government is essential but, community planning can be most effective if interest and initiative is generated at the local level. The enormous benefits accrued as a result of good planning can more than compensate for the initial investment.

Community planning can be described as an effort to control and direct development effectively. This can best be achieved through the development of an official plan. An official plan is the stated intention of the local authorities with respect to orderly development within the planning area, that is prepared and set forth with professional assistance and meets the requirements as set out by the Provincial Planning Act. An official plan can be a joint effort by a number of municipalities which have common basic characteristics and common problems, or one municipality can establish a plan on its own initiative.

Orderly development yields future economy in services. Development in the community can be retarded where an official plan does not exist. A plan provides, among other things, the

framework for the rational design of water and sewage works and also the extensions of mains and collector sewer systems.

A local council having decided to proceed with a program of community planning should contact the Ontario Department of Municipal Affairs. Through its many branches, information and guidance is provided to all interested parties.

Significance of Laboratory Analyses

APPENDIX III

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objective for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Number (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million (ppm) is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish. Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity

Turbidity is caused by the presence of suspended matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and the results are reported in "turbidity units".

Physical Determinations

Dissolved Oxygen

The amount of dissolved oxygen contained in unpolluted water fluctuates with the temperature. A deficiency of oxygen in the water is replaced by oxygen from the atmosphere. There is a saturation value for each temperature. At 18° C this is 9.54 ppm of dissolved oxygen. Values below the saturation level indicate the presence of polluting organic substances which are absorbing oxygen from the water. The extent of this deficiency is one index of the degree of organic pollution. Substantial reduction in

dissolved oxygen causes suffocation of fish.

Temperature

The temperature of water influences the solubility of oxygen and the rate of oxidation and purification.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharged does not exceed 20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

APPENDIX III

Nitrogen

Ammonia Nitrogen is sometimes called free ammonia and is the soluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation product of ammonia. The significance of nitrites, therefore, varies with their amount, source and relation to other constituents of the sample, notably the relative magnitude of ammonia and nitrate present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide. Low, less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high, greater than 1.0 ppm

Phosphorus

Total Phosphorus

Total Phosphorus is a measure of both the organic and inorganic forms of phosphorus present.

Soluble Phosphorus is a measure of the orthophosphate only and when subtracted from the total phosphorus gives an indication of the concentration of organic phosphorus present. That is, the soluble phosphorus in the form of polyphosphate, which, however, in surface waters is usually insignificant. Inorganic phosphorus in concentration in excess of 0.01 ppm may cause nuisance conditions.

Anionic Detergents (ABS)

The presence of anionic detergents as ABS is an indication that domestic waste is present.

APPENDIX III

Chemical Analyses

Hardness

The hardness of water reflects the nature of the geological formations with which it has been in contact. Hard waters are as satisfactory for human consumption as soft waters. Water with a hardness of 75-100 ppm are considered moderately hard and waters with a hardness of 150-300 ppm are classified as hard.

Alkalinity

The alkalinity of natural waters is caused by three major classes of materials which may be ranked in order of their effect on pH as follows: (1) hydroxides (2) carbonates and (3) bicarbonates and other salts of weak acids. The alkalinity of water has little sanitary significance but is of importance in water, sewage and industrial waste treatment practices.

Iron

The OWRC Drinking Water Objectives set a limit of 0.3 ppm for iron. This limitation is based on consideration of appearance rather than health.

Chlorides

Chlorides in reasonable concentrations are not harmful to humans. At concentrations above 250 ppm they give a salty taste to the water which is objectionable to many people. For this reason, the OWRC Drinking Water Objectives recommends that chlorides be

limited to 250 ppm in supplies intended for public use.

pH

The pH value, for practical purposes, refers to acidity or alkalinity, and is a measure of intensity rather than quality. The pH scale extends from zero (very acidic) to 14 (very alkaline), with the middle value of 7 corresponding to neutrality at 25° Centigrade. The pH of surface water should be in the range of 6.7 to 8.5.

VILLAGE OF TWEED

Water Pollution Survey

<u>Sampling Point</u>	<u>Location</u>	<u>Date</u>	Bacteriological Examination <u>Coli/100 ml</u>	<u>B.O.D.</u>	<u>SOLIDS</u>	
					<u>Total</u>	<u>Susp.</u>
M-32.13	West side Moira River @ Holdcroft Street	July 20	2,100	0.4	130	5
		Sept.20	10,500	0.9	80	4
M-31.80	West side Moira River @ intersection North Victoria Street & French settlement Road	July 20	192	0.3	124	1
		Sept.20	3,800	0.5	74	3
M-31.58	West side Moira River @ Dam south of Bridge Street	July 20	570	0.5	148	5
		Sept.20	1,430	0.8	78	2
M-31.49	West side Moira River @ north end Mary Street	July 20	35,000	0.6	132	2
		Sept.20	14,000	0.5	96	3
M-31.41	South side Moira River @ end of Louisa Street	July 20	1,020	0.2	118	1
			9,000	0.4	66	4
M-31.40T	North side Moira River @ Spring Street Area of Septic Tank Outfall	July 20	670	0.6	140	1
		Sept.20	3,100	0.5	78	2

(Continued)

VILLAGE OF TWEED

Water Pollution Survey

<u>Sampling Point</u>	<u>Location</u>	<u>Date</u>	Bacteriological Examination <u>Coli/100 ml</u>	<u>B.O.D.</u>	<u>SOLIDS</u>	
					<u>Total</u>	<u>Susp.</u>
M-31.35	North side Moira River @King Street	July 20	41,000	0.7	126	4
		Sept.20	92,000	1.3	92	2
M-31.34T	South side Moira River @ intersection of Jamieson Street & James Street	July 20	280	0.4	154	4
		Sept.20	1,340	0.3	54	4
M-31.20	South side Moira River @ C.P.R. Crossing	July 20	17,000	0.6	144	2
		Sept.20	14,000	0.5	74	4
S-10	Stoco Lake @ mouth of Moira River		4,400	0.4	132	5
S-20			40	0.8	134	5
S-21	Stoco Lake opposite septic in park	July 20	96	1.1	136	7
S-22	Stoco Lake @ Dept. Of Lands & Forests Dock	July 20	40	0.7	134	3
		Sept.20	4,500	3.4	66	6
P.D.B.	Park Diving Board	July 20	72	0.8	156	4
		Sept.20	2,300	3.5	114	8

(Continued)

VILLAGE OF TWEED

Water Pollution Survey

<u>Sampling Point</u>	<u>Location</u>	<u>Date</u>	Bacteriological Examination <u>Coli/100 ml.</u>	<u>B.O.D.</u>	<u>SOLIDS</u>	
					<u>Total</u>	<u>Susp.</u>
S-24(A)	Drainage Ditch near dock in Park	July 26 Sept. 20	14,000 n o f l o w	2.9	550	6
S-24(B)	Storm sewer outlet at park near dock	July 26 Sept. 20	25,000 n o f l o w	3.6	798	268
B-0.12	Near McGowan Street- Drainage Ditch-Mr. J. Beer's property	July 26 Sept. 20	720 n o f l o w	1.5	482	1
B-0.23	South end of Isaac St. Mr. Thurston's property- drainage ditch	July 26 Sept. 20	1,400 n o f l o w	4.0	528	10
A-0.37	River St. @ McGowan St. Drainage Ditch	July 26	210,000	21.0	996	306
A-0.46	Lakewood Products-Drainage tile Phenols-20; Ether Soluble-2 Phenols-300; Ether Soluble-59	July 26 Sept. 20	17,000,000 26,000,000	11 1060	1106 32572	390 31838

The letter "s" denotes sampling points in Stoco Lake.

The letters A & B designate two drainage course; one runs along River Street & empties into Stoco Lake near James street and the other empties into Stoco Lake in the vicinity of the Diving Board in the Park.

WATER QUALITY MONITORING PROGRAM

PERIOD - OCTOBER 1965 - SEPTEMBER 1966

WATERSHED MOIRA RIVER

STREAM MOIRA RIVER

SAMPLING POINT NUMBER M-44.4

LOCATION AT COUNTY ROAD BRIDGE

DATE	MF COLIFORMS PER 100 ML	SOLIDS		COND. IN MICRO- MHOS	TURB. UNITS	PHOSPHORUS		NITROGEN			CHLORIDE AS CL.	HARDNESS AS CaCO ₃	ALKALINITY		IRON AS FE	PHENOLS		WATER	
		TOTAL	SUSP.			TOTAL SOL.	FREE	TOTAL	AMMONIA	KJEL.			AS	AS		IN	DO	TEMP.	5-DAY
																		°C.	BOD
Nov. 15/65						0.28									7.8	2			
JULY 28/66	0	248	4		**	0.32	0.26	0.36	1.00	0.01	0.04	7					7	23	3.0
AUG. 30/66	160	192	2		4.0	0.34	0.28	0.28	0.84	0.00	0.05	8	146	130	0.07	8.3	9	23	2.0
Nov. 8/66	572	206	<15		3.6	0.22	0.22	0.12	0.65	0.01	0.00	4					12.0	7.0	1.5
DEC. 16/66	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	14.0	0.0	---
JAN. 17/67	132	262	XX		XX	0.12	0.10	XX	XX	XX	0.15	10					12.0	0.0	1.9
JAN. 31/67	930	194	<15		2.5	0.00	0.00	0.06	0.58	0.01	0.20	8	148	117			10.0	---	1.2
MAR. 14/67	150	244	2		1.1	0.18	0.10	0.43	0.71	0.00	0.18	8	168	135	0.32	7.7	9.0	0.5	2.5
APR. 4/67	800	138	1		4.0	0.08	0.06	0.05	0.13	0.01	0.40	5	112	92	0.20	7.5	11.0	10.0	1.0
MAY 9/67	90	172	<15		5.0	XX	0.13	0.26	0.71	0.00	0.00	5					6.0	10.0	3.4
JUNE 7/67	4	172	<15		1.5	0.22	0.16	0.18	0.58	0.00	11.0	4					4.0	22.0	1.2
JULY 4/67	40	164	<15		4.0			0.13	0.91	---	0.06	7	146	136	0.24	8.0	6.0	22.0	1.2
AUG. 2/67	12	172	5		4.0	0.25	0.20	0.23	0.84	0.00	0.07	6	146	128	0.19	8.0	6.0	24.0	1.4
SEPT. 5/67	88	216	2		4.5	0.59	0.34	0.12	0.33	0.003	0.04	7	154	133	0.30	8.4			3.3
OCT. 2/67	150	186	6		10.5	0.23	0.20	0.16	0.65	0.007	0.10	8	146	130	0.10	7.8	8.0	11	3.4
NOV. 1/67	70	172	1		10.5	0.20	0.15	0.13	0.84	0.013	1.50	6	126	104	0.40	7.9	9.0	8	0.8
DEC. 5/67	92	218	<15		4.0	0.26	0.22	0.20	0.84	0.005	0.10	5	148	124	0.30	8.4	12	1	0.7
JAN. 3/68	44	210	1		4.5	0.11	0.10	0.05	0.58	0.013	0.10	6	144	123	0.31	7.5	11	0	0.5
FEB. 5/68	40																10	1	

ALL ANALYSES EXCEPT PH REPORTED IN (PPM) UNLESS OTHERWISE INDICATED

WATER QUALITY MONITORING PROGRAM

PERIOD -OCTOBER 1965 - FEBRUARY 1968

WATERSHED MOIRA RIVER

STREAM MOIRA RIVER

SAMPLING POINT NO. M-31.2

LOCATION AT JAMESON STREET (TWEED)

DATE	MF COLIFORMS PER 100 ML	5-DAY BOD	SOLIDS		COND. IN MICRO- MHOS	TURB. UNITS	PHOSPHORUS		N I T R O G E N A S N				CHLORIDE AS CL.	HARDNESS AS CaCO ₃	ALKALINITY AS CaCO ₃	IRON AS FE	PHENOLS		WATER TEMP. °C
			TOTAL	SUSP.			TOTAL SOL.		FREE AMMONIA	TOTAL KJEL.	NITRITE	NITRATE					IN	DO	
OCT.21/65	530	1.6	--	--		2.5	0.14	0.10	0.05	1.00	TR	0.0	5	96	72	0.12	7.8	9	11
MAR.10/66	40	2.5	160	<15		0.5	0.20	0.20	0.06	0.91	0.01	0.15	5	102	87	0.46	7.3	13	0.5
MAY 4/66	40	2.1	138	<15		1.7	0.04	0.04	0.05	0.40	0.01	0.08	5	80	64	0.30	8.1	12	9
JUNE 16/66	490	1.3	132	3		--	--	--	--	0.65	--	0.00	--	--	--	--	7.9	8	20
JULY 28/66	240	0.7	120	2		--	0.10	0.05	0.20	0.78	--	0.05	3	--	--	--	--	8	24
AUG.30/66	230	1.4	62	2		2.9	0.10	0.04	0.05	0.58	0.00	0.02	2	44	34	0.25	8.1	8	23.5
NOV.8/66	1300	1.0	96	<15		2.6	0.06	0.01	0.08	0.33	0.01	0.00	2	--	--	--	--	12.5	5.5
DEC.16/66	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	13.0	0.0
JAN.17/67	460	2.2	122	24		--	0.02	0.02	0.26	--	0.00	0.10	5	--	--	--	--	12.0	0.0
JAN 31/67	308	2.0	132	<15		3.3	0.00	0.00	0.03	0.52	0.00	0.16	5	80	61	--	--	14.0	0.0
MAR.14/67	480	2.9	128	1		9.0	0.16	0.12	0.43	0.71	0.00	0.20	4	82	62	0.62	7.6	11.0	0.0
APR.4/67	152	1.5	96	5		7.5	0.02	0.02	0.28	0.40	0.01	0.20	4	66	48	0.43	7.5	13.	2.0
MAY 9/67	220	3.3	112	<5		9.0	--	0.095	0.13	0.65	0.00	0.05	3	--	--	--	--	8.0	9.5
JUNE 7/67	440	1.0	116	3		2.6	0.12	0.115	0.30	0.58	0.01	3.7	2	--	--	--	--	4.0	20.5

(CONTINUED)

ALL ANALYSES EXCEPT PH REPORTED IN (PPM) UNLESS OTHERWISE INDICATED

WATER QUALITY MONITORING PROGRAM

PERIOD - OCTOBER 1965 - FEBRUARY 1968

WATERSHED MOIRA RIVER

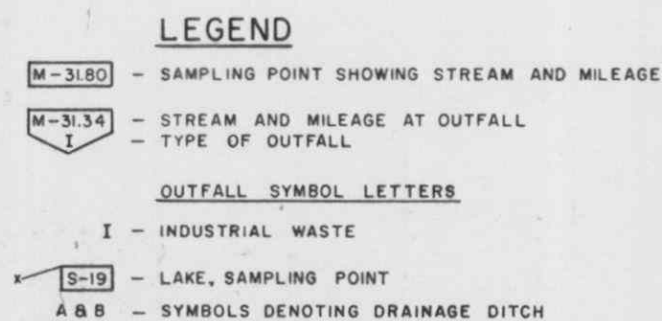
STREAM MOIRA RIVER

SAMPLING POINT NO. M-31.2

LOCATION AT JAMESON STREET (TWEED)

DATE	MF	SOLIDS			COND.	TURB. UNITS	PHOSPHORUS		N I T R O G E N A S N				CHLORIDE	HARDNESS	ALKALINITY	IRON	PHENOLS		WATER
	COLIFORMS	5-DAY	TOTAL	SUSP.	IN		TOTAL SOL.	FREE	TOTAL	AS CL	AS CaCO ₃	AS CaCO ₃	AS Fe	PH	IN (PPB)	DO	TEMP. 0°C.		
	PER 100 ML	BOD			MICRO- MHOS		AMMONIA	KJEL.	NITRITE									NITRATE	
JULY 4/67	1010	0.6	94	<15		3.8	0.46	0.06	0.10	0.65	0.00	0.12	3	76	67	0.58	7.9	7.0	21
AUG. 4/67	5900	0.8	82	9		3.1	1.10	0.09	0.18	0.52	0.01	0.04	3	72	58	0.39	7.2	8.0	23.5
SEPT. 5/67	12800	0.9	75	3		3.1	0.12	0.12	0.20	0.46	0.008	0.10	2	54	39	0.75	8.1		
OCT. 2/67	1090	1.0	114	5		5.0	0.13	0.05	0.23	0.92	0.007	0.10	4	74	62	0.22	7.7	10	11.5
NOV 1/67	210	0.8	100	3		11.5	0.10	0.06	0.16	0.58	0.014	x x	2	76	60	0.37	7.9	13	6
DEC. 5/67	100	0.2	114	<15		3.3	0.12	0.08	0.20	0.52	0.006	0.10	3	76	63	0.44	8.3	8	6
JAN. 3/68	120	0.5	130	2		7.0	0.08	0.06	0.03	0.46	0.014	0.10	3	86	71	0.44	7.3	12	0
FEB. 5/68	112	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---	11	0

ALL ANALYSES EXCEPT PH REPORTED IN (PPM) UNLESS OTHERWISE INDICATED



DRAWING N°: 65-106